

**Abstract of the Invention**

A system and method for improving the efficiency and effectiveness of the transmission of acoustical energy to process fluids during substrate processing, such as cleaning or photoresist stripping. The invention utilizes a layered stack of materials to transmit acoustical energy from a source of acoustical energy to the process fluid. The material of which each layer is constructed is chosen so as to reduce the differences in acoustical impedance between consecutive layers of the stack, providing a more gradual transition, in terms of acoustical impedance, when acoustical energy is being transmitted from the source to the process fluid. In one aspect, the invention is a system comprising: a process chamber for receiving a process fluid; an acoustical energy source; and an acoustical stack having a first transmission layer and a second transmission layer that forms an acoustical energy pathway from the acoustical energy source to the process fluid in the process chamber.